

SECTION 04 05 13
MASONRY MORTAR

PART 1 - GENERAL

1.1 DESCRIPTION:

The Work of this Section specifies mortar materials and mixes.

1.2 RELATED WORK:

- A. Mortar used in Section:
 - 1. Section 03 48 24, PRE-CAST CONCRETE COLUMBARIUM UNITS.
 - 2. Section 04 05 16, MASONRY GROUTING.
 - 5. Section 04 43 00, NATURAL STONE VENEER.

1.3 TESTING LABORATORY-CONTRACTOR RETAINED

- A. Engage a commercial testing laboratory approved by the Contracting Officer's Representative (COR) to perform tests specified below and in 01 45 29, TESTING LABORATORY SERVICES.
- B. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to the COR.

1.4 TESTS

- A. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
- B. Mortar:
 - 1. Test for compressive strength and water retention; ASTM C270.
 - 2. Mortar compressive strengths 28 days as follows:
 - Type S: Minimum 1800 psi at 28 days.
 - Type N: Minimum 750 psi at 28 days.
- C. Cement:
 - 1. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.
 - 2. Nonstaining cement shall contain not more than 0.03 percent water soluble alkali.
- D. Sand: Test for deleterious substances, organic impurities, soundness and grading.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Certificates:
Indicating that following items meet specifications:
 - a. Portland cement.
 - b. Masonry cement.
 - c. Mortar cement.
 - d. Hydrated lime.
 - e. Fine aggregate (sand).
 - f. Color admixture.
- C. Laboratory Test Reports:
 - 1. Mortar, each type.
 - 2. Admixtures.
- D. Manufacturer's Literature and Data:
 - 1. Cement, each kind.
 - 2. Hydrated lime.
 - 3. Admixtures.
 - 4. Liquid acrylic resin.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.
- B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - C40.....Organic Impurities in Fine Aggregates for
Concrete
 - C91.....Masonry Cement

C109.....	Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-MM Cube Specimens)
C144.....	Aggregate for Masonry Mortar
C150.....	Portland Cement
C207.....	Hydrated Lime for Masonry Purposes
C270.....	Mortar for Unit Masonry
C595.....	Blended Hydraulic Cement
C780.....	Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C979.....	Pigments for Integrally Colored Concrete
C1329.....	Mortar Cement

PART 2 - PRODUCTS

2.1 HYDRATED LIME

ASTM C207, Type S.

2.2 QUICKLIME

A. ASTM C5.

2.3 LIME PUTTY

A. Made from hydrated lime or quicklime.

1. If made from quicklime, other than processed pulverized quicklime, slake lime and then screen through a No. 16 mesh sieve. Before using, store and protect slaked and screened lime putty for not less than 10 days.
2. Processed pulverized quicklime shall be slaked for not less than 498 hours, and shall be cool when used.
3. Lime putty prepared from hydrated lime may be used immediately after mixing.
4. Lime putty prepared from quicklime or pulverized quicklime shall have a plasticity figure, after slaking and screening, of not less than 200, and shall weigh not less than 83 lbs. per cubic foot. Lime putty prepared from hydrated lime shall conform to ASTM C 207, Type S.

2.4 AGGREGATE FOR MASONRY MORTAR

A. ASTM C144 and as follows:

1. Light colored sand for mortar for laying face stone.

B. Test sand for color value in accordance with ASTM C40. Sand producing color darker than specified standard is unacceptable.

2.5 MASONRY CEMENT

- A. ASTM C91. Type N or S.

2.6 MORTAR CEMENT

- A. ASTM C1329, Type N or S.
 - 1. 28-day compressive strength of not less than 1800 psi.
 - 2. Conforming to IBC Section 2103.

2.7 PORTLAND CEMENT

- A. ASTM C150, Type I or II.

2.8 WATER

- A. Potable, free of substances that are detrimental to mortar, masonry, and metal.

2.10 MASONRY MORTAR

- A. Conform to ASTM C270.
- B. Mortar mix shall be proportioned by volume: one part Portland Cement, not less than 1/4-part nor more than 1/2-part lime putty, and sand totaling not less than 2-1/4 times nor more than 3 times sum of volumes of cement and lime used.
 - 1. Total clay content shall not exceed 2% of sand content or 6% of cement content.
- B. Admixtures:
 - 1. Do not use mortar admixtures, except color admixtures if approved by Resident Engineer.
 - 2. Submit laboratory test report showing effect of proposed admixture on strength, water retention, and water repellency of mortar.
 - 3. Do not use antifreeze compounds.
- C. Colored Mortar:
 - 1. Maintain uniform mortar color for exposed work throughout.
 - 2. Match mortar color in approved sample or mock-up.
 - 3. Color of mortar for exposed work in alteration work to match color of existing mortar.

D. Color Admixtures:

1. Proportion as specified by manufacturer.
2. Color to match existing.

2.11 COLOR ADMIXTURE

A. Pigments: ASTM C979.

B. Use mineral pigments only. Organic pigments are not acceptable.

C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.

PART 3 - EXECUTION

3.1 MIXING

A. Mix in a mechanically operated mortar mixer.

1. Mix mortar for at least two minutes but not more than five minutes. Then add lime putty and continue mixing to ensure uniform mass, but in no case fewer than 10 minutes.
2. Use mixers of at least one sack capacity; batches requiring fractional sacks will not be permitted unless cement is weighed for each batch.

B. Measure ingredients by volume. Measure by the use of a container of known capacity. Accurately Measure materials in suitably calibrated devices; shovel measurements are not acceptable. Each 94-lb sack of Portland cement will be considered as 1 cubic foot.

C. Mix water with dry ingredients in sufficient amount to provide a workable mixture which will adhere to vertical surfaces of masonry units.

D. Mortar that has stiffened because of loss of water through evaporations:

1. Re-tempered by adding water to restore to proper consistency and workability.
2. Discard mortar that has reached its initial set or has not been used within 30 minutes.

E. Pointing Mortar:

1. Mix dry ingredients with enough water to produce a damp mixture of workable consistency which will retain its shape when formed into a ball.

2. Allow mortar to stand in dampened condition for one to 1-1/2 hours.
3. Add water to bring mortar to a workable consistency prior to application.

3.2 MORTAR USE LOCATION

- A. Use Type S mortar for masonry containing vertical reinforcing bars (non-engineered), masonry below grade, masonry solar screens, and setting cast stone, and engineered reinforced unit masonry work.
- B. For stone veneer over frame back up walls, use Type N portland cement-lime mortar or Type S masonry cement or mortar cement mortar.
- C. Use Type N mortar for other masonry work, except as otherwise specified.
- D. Use Type N mortar for tuck pointing work.
- E. Use pointing mortar for items specified.

3.3 DEFECTIVE MORTAR

- A. Should the strength of mortar fall below that specified, remainder of Work shall be adjusted to reach required strength. Work in place representing inferior mortar and indicating strength less than the minimum specified shall be tested by taking and testing core samples. Number and locations of cores shall be determined by the COR.
- B. Should compression tests of cores fail to meet required strength, masonry shall be deemed to be defective and shall be removed and replaced at no cost to the VA.
- C. Costs relative to taking and testing of core samples shall be paid by Contractor. Cost of patching core holes shall be borne by Contractor.

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